

## STS 115 Return Samples: Assessment of Air Quality aboard the Shuttle (STS-115) and International Space Station (12A)

The toxicological assessments of 2 grab sample canisters (GSCs), and 1 pair of formaldehyde badges from the Shuttle are reported in Table 1. Analytical methods have not changed from earlier reports. The recoveries of the 3 surrogates (<sup>13</sup>C-acetone, fluorobenzene, and chlorobenzene) from the 2 GSCs averaged 105, 110, and 108 %, respectively, and from 3 formaldehyde control badges the average recovery was 98 %. The Shuttle atmosphere was acceptable for human respiration.

Table 1. Analytical Summary of Shuttle Samples

Sample Location	Date of Sample	NMVOCs <sup>1</sup> (mg/m <sup>3</sup> )	T Value <sup>2</sup> (units)	Alcohols (mg/m <sup>3</sup> )	Formaldehyde (ug/m <sup>3</sup> )
Middeck	9/16/06	5	0.20	2.9	--
Middeck	9/21/06	5	0.36	0.6	--
Flight-deck	9/18/06	--	--	--	34

<sup>1</sup> Non-methane volatile organic hydrocarbons.

<sup>2</sup> Calculated excluding CO<sub>2</sub> and formaldehyde.

The toxicological assessment of 4 GSCs from the ISS is shown in Table 2. The recoveries of the 3 standards from the GSCs averaged 109, 104 and 111%. Formaldehyde badges were not returned from the ISS.

Table 2. Analytical Summary of ISS Results

Module/Sample	Approx. Date	NMVOCs <sup>1</sup> (mg/m <sup>3</sup> )	T Value <sup>2</sup> (units)	Alcohols (mg/m <sup>3</sup> )	Formaldehyde (ug/m <sup>3</sup> )
Lab/GSC/Formal.	7/28/06	11	1.09 <sup>3</sup>	4.1	--
SM/CSC/Formal.	7/28/06	7	0.45	4.2	--
Lab/GSC/Formal.	8/29/06	6	0.36	3.5	--
SM/GSC/Formal.	8/29/06	8	0.85	3.7	--
<i>Guideline</i>		<25	<1.0	<5	<120

<sup>1</sup> Non-methane volatile organic hydrocarbons.

<sup>2</sup> Calculated excluding CO<sub>2</sub> and formaldehyde.

<sup>3</sup> Primary components that increased the T value were siloxanes (0.50) and propenal (0.33).

The ISS atmosphere was found to be acceptable for human respiration. The alcohols were below the threshold established for protection of the water recovery system. Formaldehyde badges will be returned aboard the next Shuttle flight to ISS.

There was a report of an air quality issue during the attempted repair of the Elektron oxygen generator. At 2006/261:11:01 the secondary purification unit became extremely hot and generated smoke. Sometime later when a valve was opened the crew detected a "gasoline-like synthetic odor. Crew symptoms were not reported from this incident.

### Enclosures

Table 1A: [Analytical concentrations of compounds found in the STS-115 GSCs](#)

Table 1B: [Analytical concentrations of compounds found in 12A GSCs](#)

Table 2A: [T-values of the compounds in table 1](#)

Table 2B: [T-values of the compounds in table 1B](#)